

## CLAIMS

What is claimed is:

1. A circuit board assembly, comprising:

a. a circuit board;

b. an integrated circuit package having a substrate with an array of solder columns extending from a bottom surface of the substrate to the circuit board when the integrated circuit package is mounted on the circuit board;

c. a lid affixed to the substrate, the lid having a portion that extends beyond an outer periphery of the substrate; and

c. at least one support shim disposed between the portion of the lid that extends beyond the outer periphery of the substrate and a portion of the circuit board to which the column grid array integrated circuit package is mounted to support the column grid array integrated circuit package against compressive force.

2. The apparatus of claim 1 wherein the lid is oversized with respect to the substrate so that an outer periphery of the lid is larger than the outer periphery of the substrate so that the portion of the lid that extends beyond the outer periphery of the substrate extends around the outer periphery of the substrate.

3. The apparatus of claim 2 wherein each support shim is disposed between the portion of the lid that extends beyond the periphery of the substrate and the portion of the circuit board after the integrated circuit package is mounted on the circuit board and secured to at least one of the lid and the substrate by adhesive, the adhesive accommodating variations in the height of the integrated circuit package.

1           4.     The apparatus of claim 2 wherein the column grid array integrated  
2 circuit package is rectangular and the said at least one support shim includes a  
3 support shim disposed at each corner of the column grid array integrated circuit  
4 package.

1           5.     The apparatus of claim 4 wherein each support shim is a corner shim  
2 having first and second leg sections at generally right angles to each other.

1           6.     The apparatus of claim 5 wherein each support shim has an inwardly  
2 extending top flange having first and second sections at generally right angles to  
3 each other.  
4

1           7.     The apparatus of claim 6 wherein adhesive is disposed between the  
2 top flange of each support shim and the portion of the lid extending beyond the outer  
3 periphery of the substrate to affix the support shim to the column grid array  
4 integrated circuit package and to fill gaps between the top flanges of the support  
5 shims and the portion of the lid extending beyond the outer periphery of the  
6 substrate.

1           8.     A circuit board assembly, comprising:

2           a.     a circuit board;

3           b.     a rectangular column grid array integrated circuit package having a  
4 substrate with an array of solder columns extending from a bottom surface;

5           b.     a lid affixed to the substrate, the lid having a portion that extends  
6 beyond an outer periphery of the substrate; and

7           c.     a support shim disposed at each corner of the column grid array  
8 integrated circuit package between the portion of the lid that extends beyond the  
9 outer periphery of the substrate and a portion of a circuit board to which the column  
10 grid array integrated circuit package is mounted to support the column grid array  
11 integrated circuit package against compressive force, each support shim disposed  
12 between the lid and the circuit board after the integrated circuit package has been  
13 mounted to the circuit board and secured to at least one of the substrate and lid by  
14 adhesive, the adhesive accommodating variations in height in the integrated circuit  
15 package.

1           9.     The apparatus of claim 8 wherein the lid is oversized with respect to  
2 the substrate so that an outer periphery of the lid is larger than the outer periphery of  
3 the substrate so that the portion of the lid that extends beyond the outer periphery of  
4 the substrate extends around the outer periphery of the substrate.

1           10.    The apparatus of claim 9 wherein each support shim is a corner shim  
2   having first and second leg sections at generally right angles to each other and an  
3   inwardly extending top flange having first and second sections at generally right  
4   angles to each other, each support shim affixed to the column grid array integrated  
5   circuit package by adhesive disposed between the portion of the lid extending  
6   beyond the periphery of the substrate and that support shim's top flange, the  
7   adhesive filling a gap between the portion of the lid extending beyond the periphery  
8   of the substrate and the top flange of that support shim.

          11.    The apparatus of claim 1 wherein the integrated circuit package  
          comprises a column grid array integrated circuit package.

1           12.    In a circuit board assembly having a circuit board and an integrated  
2   circuit package, the integrated circuit package having a substrate with an array of  
3   solder columns extending from a bottom surface of the substrate to the circuit board,  
4   a method of supporting the integrated circuit package against compressive force,  
5   comprising the steps of affixing an oversized lid to the substrate having a portion that  
6   extends beyond a periphery of the substrate, and disposing at least one support  
7   shim between the portion of the lid that extends beyond the periphery of the  
8   substrate and the circuit board after the integrated circuit package has been  
9   mounted on the circuit board.

1           13.    The method of claim 12 and further including the step of affixing the at  
2   least one support member by adhesive to the lid, the adhesive accommodating any  
3   variations in height of the integrated circuit package.

1           14.    The method of claim 13 wherein the step of affixing the at least one  
2   support member by adhesive to the lid includes filling any gaps between the lid and  
3   the at least one support member with the adhesive.

1           15.    The method of claim 13 wherein the integrated circuit package is  
2   rectangular and the step of providing the at least one support member includes  
3   providing at least one support member at each corner of the integrated circuit  
4   package.

1           16.    The method of claim 13 wherein the integrated circuit package is  
2   rectangular and the step of providing the at least one support member includes  
3   providing at least one support member at each side of the integrated circuit package.

1           17.    The method of claim 13 wherein the integrated circuit package is a  
2   column grid array integrated circuit package.